

Spot Safety Project Evaluation

Project Log # 200512160

Spot Safety Project # 05-98-238

**Spot Safety Project Evaluation of the Traffic Signal Installation
At the Intersection of SR 1834 (Norwood Rd) and
SR 1844 (Mt. Vernon Church Rd)
Wake County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

Brad Robinson, EI

2/12/07
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 05-98-238 – The Intersection of SR 1834 (Norwood Rd) at SR 1844 (Mt. Vernon Church Rd) in Wake County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a traffic signal. SR 1834 (Norwood Rd) and SR 1844 (Mt. Vernon Church Rd) are both 2-lane roads with speed limits of 45 mph and no turn lanes in the study area. The subject intersection is a 4-leg intersection which was controlled by a flasher and stop signs on SR 1844 (Mt. Vernon Church Rd) in the before period.

The original statement of problem was that traffic volumes had increased to the point where motorists could not maneuver safely through the intersection. A private citizen originally requested the signal investigation. After the investigation, it was determined that the intersection satisfied traffic signal warrants 9 and 11.

The initial crash analysis was completed from July 1, 1996 to June 30, 1999 with 15 reported crashes, with 12 that were considered correctable by the chosen countermeasure. The final completion date for the improvement at the subject intersection was on September 22, 2000 with a total cost of \$35,000.00.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from August 1, 2000 to October 31, 2000. The before period consisted of reported crashes from March 1, 1997 through July 31, 2000 (3 years and 5 months) and the after period consisted of reported crashes from November 1, 2000 through March 31, 2004 (3 years and 5 months). The beginning date for this analysis was limited by the installation of a flasher at the intersection in January 1997.

The treatment data consisted of all crashes within 150 feet of intersection. *Please see attached location map for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	15	1	-93.3
Total Severity Index	2.97	1	-66.3
Target Crashes	12	0	-100.0
Target Crash Severity Index	3.47	N/A	N/A
Volume	5,900	6,000	1.7
<u>Crash Severity Summary</u>			
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	3	0	-100.0
Class C Crashes	1	0	-100.0
PDO Crashes	11	1	-90.9

The naive before and after analysis at the treatment location resulted in a 93 percent decrease in Total Crashes, a 100 percent decrease in Target Crashes, a 66 percent decrease in the Total Severity Index, and a 2 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1998 and the after period ADT year was 2002.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 93 percent decrease in Total Crashes and a 100 percent decrease in Target Crashes, with a 2 percent increase in ADT. The Total Severity Index decreased by 66 percent, while injury crashes of all types decreased to 0. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

Referencing the *Collision Diagrams*, it is apparent that the installation of the traffic signal helped reduce crashes at the intersection. In the before period, there was an Angle Crash pattern between southbound vehicles on SR 1844 and westbound vehicles on SR 1834. This might have been caused by the large skew of the intersection, requiring drivers to turn their heads at a large angle. This crash pattern was eliminated in the after period.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Treatment Location: SR 1834 (Norwood Rd) and SR 1844 (Mt Vernon Church Rd)

Treatment Site Photos Taken October 11, 2006



Looking Eastbound on SR 1834 (Norwood Rd)



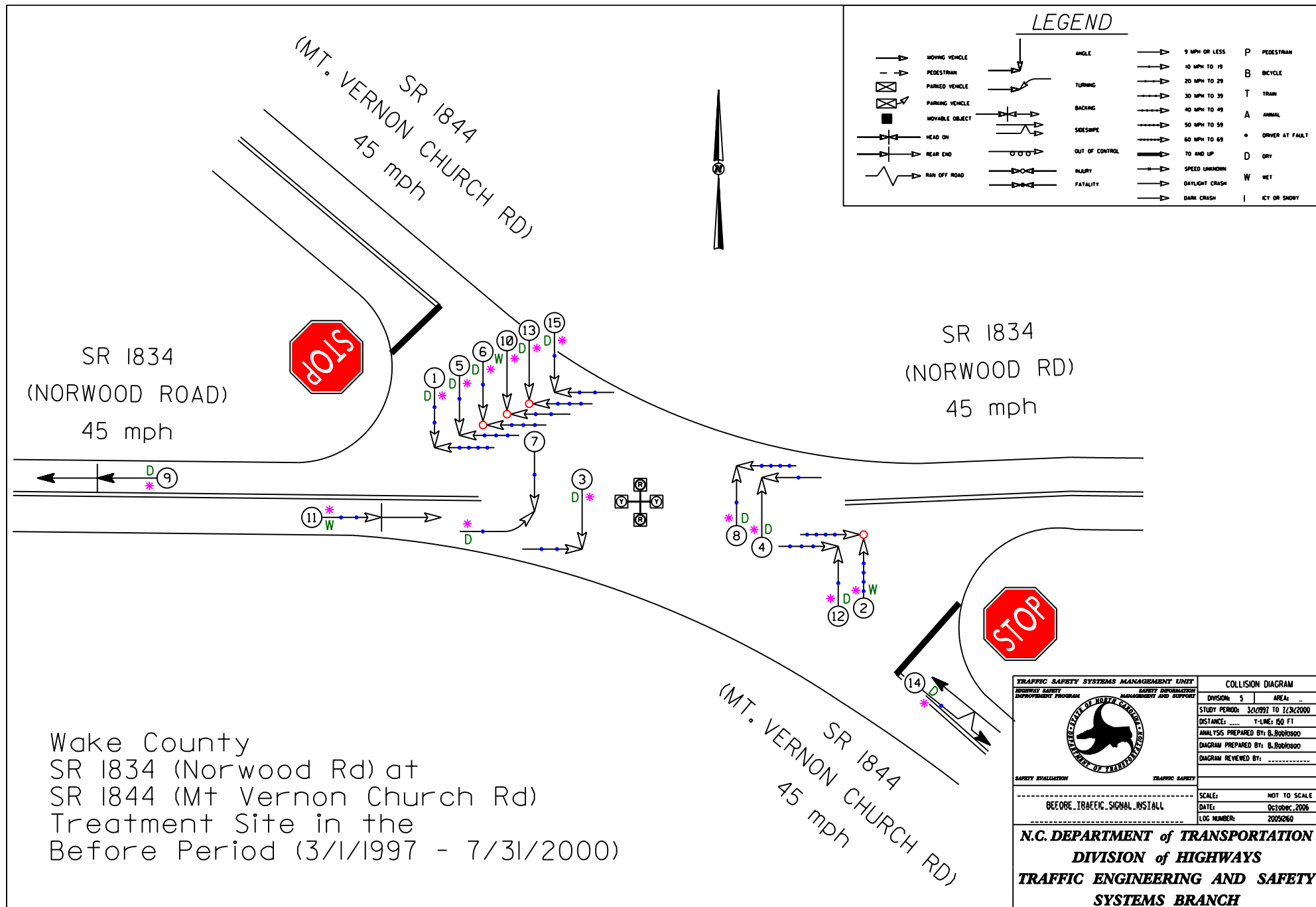
Looking Westbound on SR 1834 (Norwood Rd)



Looking Northbound on SR 1844 (Mt Vernon Church Rd)



Looking Southbound on SR 1844 (Mt Vernon Church Rd)

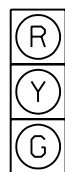


SR 1844
(MT. VERNON CHURCH RD)
45 mph

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		P PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		B BICYCLE
	PAKED VEHICLE		BACKING		20 MPH TO 29		T TRAIN
	PAKED VEHICLE		SIDESWIPE		30 MPH TO 39		A ANIMAL
	MOVABLE OBJECT		OUT OF CONTROL		40 MPH TO 49		* DRIVER AT FAULT
	HEAD ON		HALTURY		50 MPH TO 59		D DRY
	REAR END		FATALITY		60 MPH TO 69		W WET
	RAN OFF ROAD				70 AND UP		I KEY OR SHOT
					SPEED UNKNOWN		
					DAYLIGHT CRASH		
					DARK CRASH		

SR 1834
(NORWOOD ROAD)
45 mph



SR 1844
(MT. VERNON CHURCH RD)
45 mph

Wake County
SR 1834 (Norwood Rd) at
SR 1844 (Mt Vernon Church Rd)
Treatment Site in the
After Period (11/1/2000 - 3/31/2004)

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT <small>ROADWAY SAFETY IMPROVEMENT PROGRAM SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>		COLLISION DIAGRAM	
		DIVISION: 5	AREA: ..
		STUDY PERIOD: 11/1/2000 TO 3/31/2004	
		DISTANCE: T-LINE: 150 FT	
		ANALYSIS PREPARED BY: B.Booth0900	
		DIAGRAM PREPARED BY: B.Booth0900	
<small>SAFETY INSTALLATION</small>		<small>TRAFFIC SAFETY</small>	
AFTER TRAFFIC SIGNAL INSTALL		SCALE: NOT TO SCALE DATE: OCT0806.2006 LOG NUMBER: 20050260	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			